

CONSORTIUM FOR UNDERGRADUATE RESEARCH EXPERIENCES (CURE)

AND RELATED UNDERGRADUATE RESEARCH
PROGRAMS OFFERED BY
CALIFORNIA STATE UNIVERSITY AT LOS ANGELES,
SEVERAL LOCAL COMMUNITY COLLEGES, AND THE
JET PROPULSION LABORATORY

Dean Arvidson
Los Angeles City College CURE Coordinator
Acting Programs Director

OVERVIEW AND PURPOSE OF **PROGRAMS**

- Scientific research programs designed for undergraduate students
- Collaboration between Cal State Los Angeles, several local community colleges and the Jet Propulsion Laboratory
- Community based programs
- Year round programs
- Funded by grants from NASA (MURED), and NSF (REU)

PURPOSE OF PROGRAMS

- JPL and the Moon
Connecting local ‘inner city’ students with JPL
- Recruit underrepresented minorities and female students to the fields of science and engineering
- Train underrepresented minorities and female students in some of the research techniques used in the fields of science and engineering
- Retain underrepresented minorities and female students in the fields of science and engineering
- Increase the number of underrepresented minorities and female students in the fields of science and engineering that transfer to four year institutions and who enroll in graduate programs

PAST AND PRESENT LIST OF PROGRAMS

- Physics Outreach Program (POP) 1995 – 1997
NASA (MURED)
- Consortium for Undergraduate Research Experiences
(CURE) 1998 – 2000
NASA (MURED)
- Research Experiences for Undergraduates (REU)
1999 – 2000
NSF (REU)
- Science Education through Extraterrestrial Research
(SEER) 1999 – 2001
NASA (MURED)
- ⇒ Consortium for Advanced Research Experiences
(CARE) 2000 – 2002
NASA (OSS & MURED)
- ⇒ Astronomy Center for Undergraduate Research,
Education and Teacher Training 2003 - ∞
NASA (OSS)

PARTICIPATING INSTITUTIONS and **FACULTY**

- Cal State Los Angeles Dr. Milan Mijic
- Pasadena City College John Sepikas
- Los Angeles City College Dean Arvidson
- Los Angeles Southwest College Walt Jordan
- East Los Angeles College Jose Ramirez
- Los Angeles Valley College David Falk
- Jet Propulsion Laboratory Dr. Steve Gillam

FACILITIES AND EQUIPMENT

- Table Mountain Observatory (TMO); owned and operated by JPL
 - 1.2 m telescope (currently under repair)
 - 0.6 m telescope; fully operational
 - 1K LN2 CCD cameras
 - 4K LN2 CCD Astrometric camera
 - NEAT camera
 - Magneto Optic Filter camera
- Astronomical Computational Laboratory; CSLA
- Griffith Observatory South; LACC
- Classrooms and computer labs at participating schools
- Los Angeles Valley College Planetarium

STUDENT SELECTION PROCESS

- Selection done by the faculty at each school in coordination with program director
- Students are selected each quarter
- Students can (and often do) participate in program for up to two years
- Criteria
 - Scientific Interest
 - Academic Motivation
 - Work History
 - GPA
 - Essay and Interview
- ~ 4 – 6 students per school at any given time. Number of students per school determined by number of programs currently running, number of mentors in need of students.

PROGRAM ACTIVITIES

- Training Classes
- Observational research projects
- Data reduction projects
- Other related projects
- Report and paper writing
- Presentations

TRAINING CLASSES

- Special Topics Courses; CSLA (Dr. Milan Mijic and John Sepikas)
 - Planetary Astronomy 1995
 - Comets 1996
- Astronomical Data Reduction Course; CSLA (Dr. Steve Gillam) Winter 1997
- UNIX Operating System; CSLA (Dr. David Gregorich) Spring 1997
- Basics of Observational Astronomy; LACC (Dean Arvidson) Summer 1997
- Advanced Data Reduction; CSLA (Dr. Steve Gillam) Winter 1998
- Telescope Operations; CSLA, TMO (Dr. Steve Gillam) Spring 1999, Summer 1999, Fall 1999, Winter 1999
- Remote Telescope Operations; CSLA (Dr. David Gregorich) Spring 2000
- Special Topics in Astronomy; CSLA (Dr. Milan Mijic, and Dr. Steve Gillam) Summer 2000

OBSERVATIONAL RESEARCH and DATA REDUCTION PROJECTS with MENTORS

- Dr. Steve Gillam; JPL
 - Observations of Comet Hale Bopp
 - Observations of Sojourner landing site (made prior to Pathfinder landing)
 - Age of Universe using Old Globular Clusters
- Ray Newburn; JPL
Photometric observations of comet Wild 2
- Dr. Neil Murphy; JPL
Jovian Seismological Investigations
- Dr. William Owen; JPL
Astrometry of Guiding Asteroids for Deep Space One
- Dr. Bonnie Buratti; JPL
Photometric evolution of Triton and Pluto
- Dr. Bryan Penprase; Pomona College
Polarimetric Studies of Circumstellar Disks
- Dr. Michael Hicks; JPL
Astrometric Follow-up of Newly Discovered Near-Earth Asteroids

RELATED PROJECTS

- Installation of ‘Astronomical Computational Laboratory’ at CSLA
- Installation of 12” Meade LX 200 telescope at TMO
- Assistance in development of Astronomy Laboratory at LACC
- Assistance in building of observatory dome at LACC
- Remodeling of 1.2 m telescope control room at TMO

PRESENTATIONS, REPORTS AND PAPERS

- Southern California Conference on Undergraduate Research (SCCUR)
 - 1997 meeting; 2 poster presentations
 - 1998 meeting; 2 poster presentations
 - 1999 meeting; 2 poster presentations
 - 2000 meeting; 4 poster presentations (projected)
- American Astronomical Society (AAS)
 - Winter 2000 meeting (Atlanta); 2 poster presentations
 - Summer 2000 meeting (Rochester); 1 poster presentation
- MUSPIN/MURED JOINT CONFERENCE
Fall 2000 meeting (Atlanta); 1 poster presentation
- More than 30 published reports and papers have been written by and contributed to by students in the programs

PROGRAM DIFFICULTIES AND PROBLEMS

- Location, Location, Location!!
Transportation difficulties to and from TMO
- The moon again!!
Scheduling observation nights that work for students, mentors, and the moon (as well as the weather)
- Under Repair!
Equipment malfunction and breakdown
- Access Denied!
Program and TMO access limitations to citizens and permanent residents

PROGRAM RESULTS **and some STUDENT STORIES**

- More than 100 students have passed through the programs so far
- Over 95 % have transferred to a four year university or enrolled in graduate school
- At least 14 students have chosen Physics or Astronomy as their major
- Other popular choices of major fields of study:
 - Electrical Engineering
 - Computer Science
 - Biochemical Engineering
 - Mechanical Engineering
 - Biochemistry
 - Applied Mathematics
 - Pure Mathematics
- Personal Stories
 - Jomel Atienza-Rosel
 - Dale Enriquez
 - Daniel Moreno

<http://tmo-web.jpl.nasa.gov/Science/Photometry/clusters.htm>